

United States Space Foundation

Space Technology

A Study of the Significance of Recognition for Innovators of Spinoff Technologies

Commercial Space Expo-USA 1993

Evaluation Report

August 1993

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1993 Commercial Space Expo-USA Evaluation Report

Introduction

This is a report on the data collected at the Commercial Space Expo as part of NASA Grant #NAGW-3322. The Expo was held April 13, 14, 1993, in conjunction with the National Space Symposium.

There were two modes of data gathering: surveys of expo registrants and exhibit feedback. In addition, we interviewed exhibitors to get their perspectives on the format of the expo and exhibits.

- Expo registrants were given a paper-pencil survey instrument at the beginning of the day and were asked to turn in the survey when they left for the day. Of the approximately 100 registrants, 22 surveys were returned. (See Appendix A for a copy of the survey.)
- In the exhibit hall were five computers set up to collect people's reactions to specific exhibits. It was envisioned that people would react to each (or several) exhibits they visited. In fact, few people did this: almost everyone who visited a computer responded to one exhibit and did not stop by another computer. Therefore, we did not get a large number of responses for any particular exhibit. Nevertheless, there are some interesting data.

Both the registrant and exhibit reaction surveys were designed in telephone and face-to-face coordination among Dr. Darwyn Linder, Arizona State University, Dr. Peter Clarke, University of Southern California, Dr. Tim Janis, president of ARAC, and Dr. Robert Ewell, president of Creative Solutions.

- Finally, Dr. Linder interviewed ten exhibitors on the second day of the Expo.
- Dr. Ewell compiled the data and drafted this report which was reviewed by the others. Dr. Ewell assumes final responsibility for this document.

Table of Contents

Expo Registrants Survey	2
Exhibit Reaction Survey	9
Interviews with Exhibitors	16
Summary	21

Appendix A: Registrants Survey

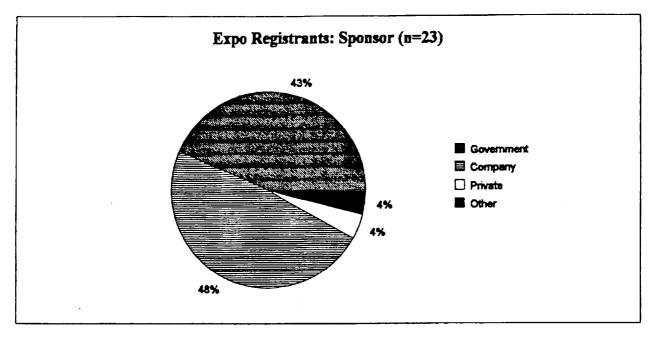
Appendix B: Exhibit Reaction Computer Setup Appendix C: Exhibit Reaction Questionnaire

Page 1

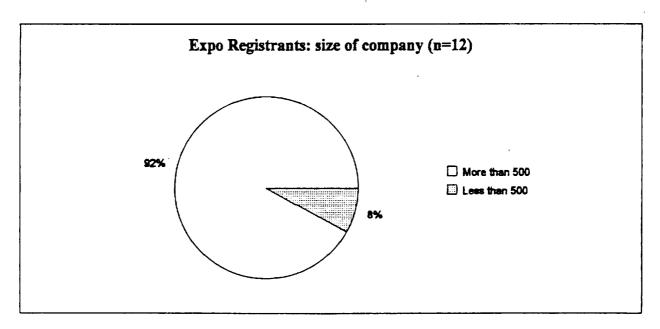
Expo registrants Survey

Demographics: Who came to the Expo?

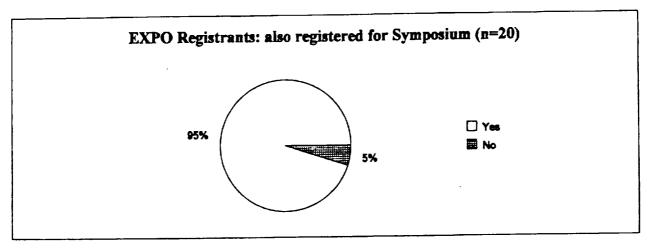
- Respondents were approximately equally distributed between government and industry.



- Of industry, nearly all were from large companies. The obvious implication of this one is we are apparently not successfully inspiring small entrepreneurs to learn how to seek their fortune in space.



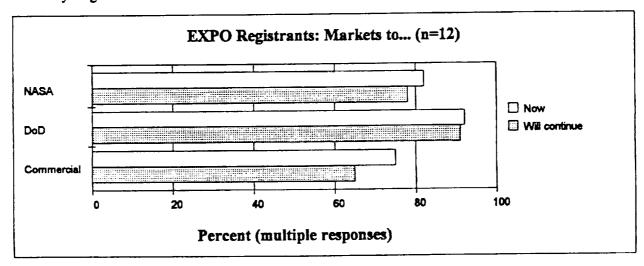
- Nearly all Expo registrants were registered for Symposium and nearly all were male. Again, at least among respondents to the survey, it doesn't look like we recruited the small business people who perhaps couldn't afford Symposium, but could have come to the Expo. Recommend we search the official registration records, weed out Expo registrants who were also exhibitors, and see how many were also registered for the Symposium.



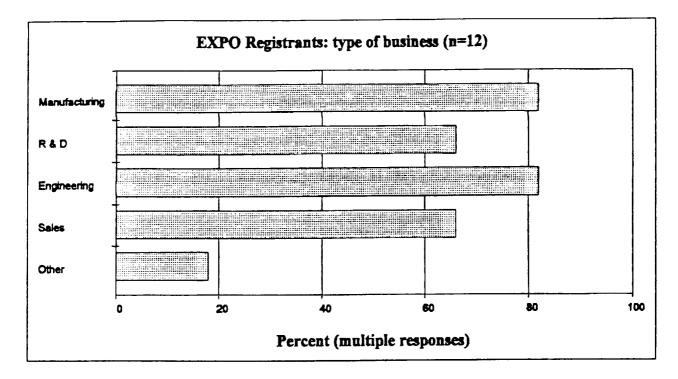
These charts show to what sector of the space industry respondents market to today and intend to pursue.

- A few more marketed to DoD than NASA with the number marketing to commercial trailing slightly.
- Nearly all will continue to market to DoD with again, slight declines for NASA and commercial.

Among this group, at least, there is continued interest in DoD with an apparently smaller tendency to go after commercial.



Industries represented were involved in activities across-the-board with the emphasis on manufacturing and engineering.

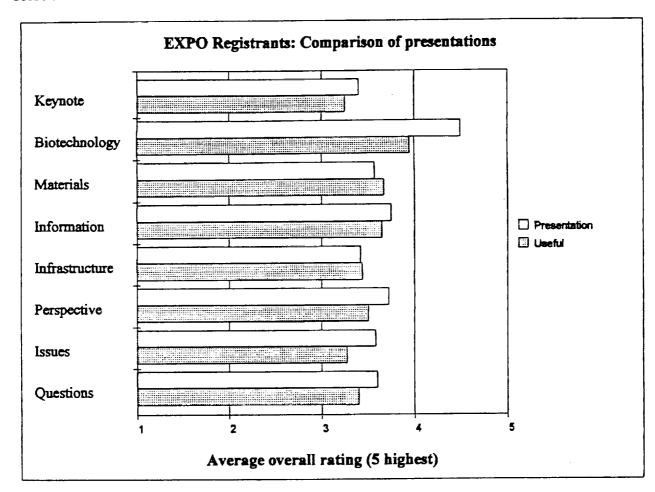


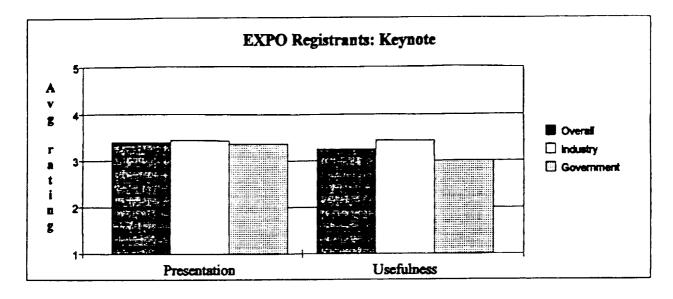
Perceptions: How did Expo registrants like the program?

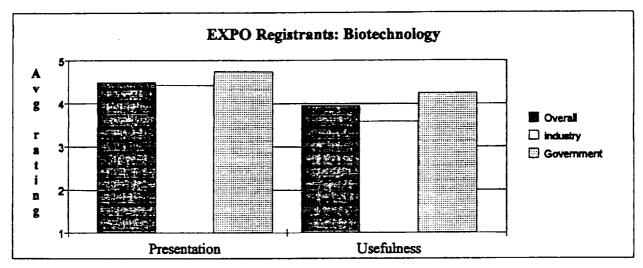
The following charts summarize Expo registrants' opinions of the various sessions along the two dimensions of presentation quality and usefulness to the respondent. In nearly all cases, presentation ranks slightly ahead of usefulness. This disparity is predictable since one's assessment of presentation quality depends mostly on the presenter while usefulness depends on the listener's need or opportunity to use the information.

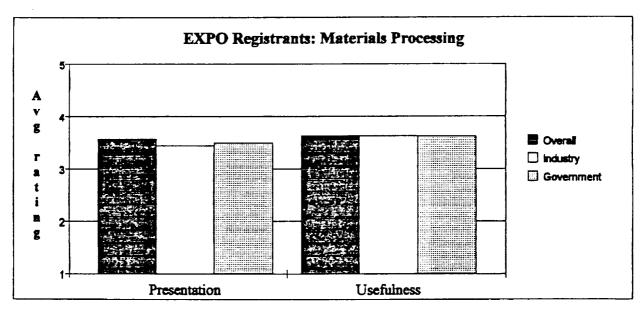
The chart below gives the overall picture showing that Biotechnology was by far the best received session but that all sessions were rated fairly high.

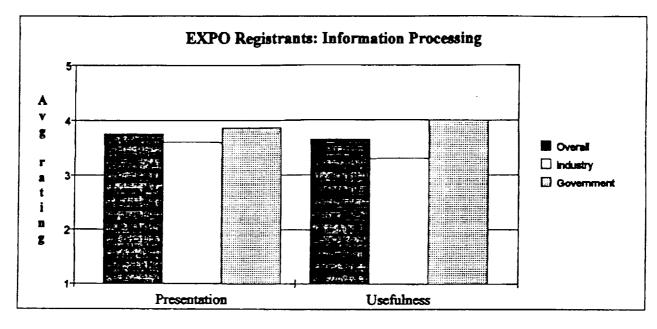
Charts following the summary break out responses on usefulness and quality by category of respondent and will be presented without specific comment. Note that generally all sessions appealed nearly equally to industry and government with industry being a little more critical in some areas.

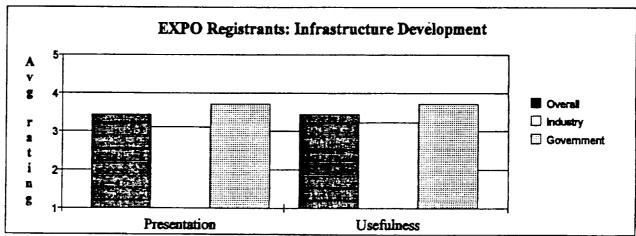


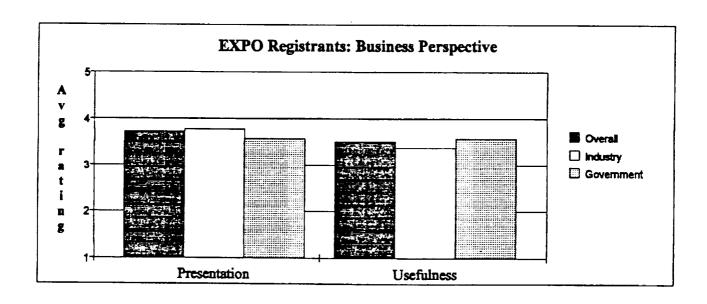




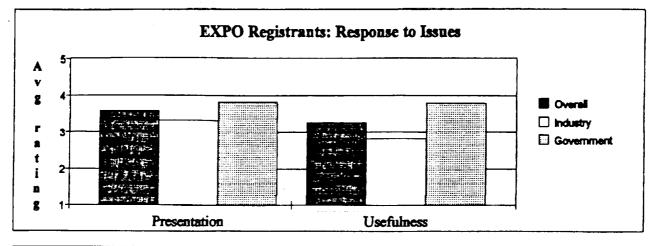


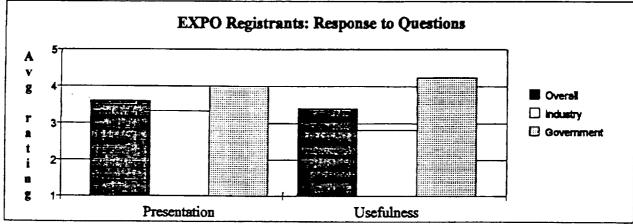




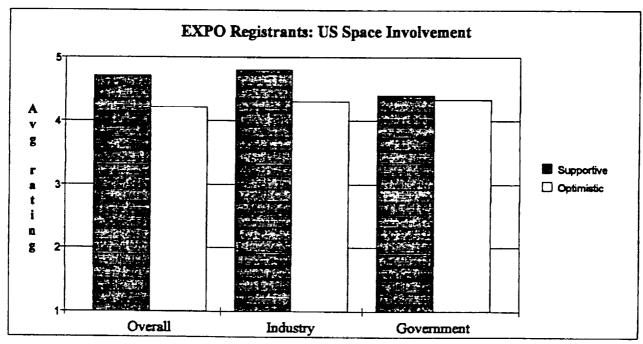


Page 7





The following chart summarizes the registrants' feelings about U.S. involvement in space and their optimism for success in the space industry. Note that the registrants are predictably highly supportive of continued U.S. involvement in space. They are also reasonably optimistic about their future success in space.



Page 8

Reactions to Exhibits

The primary purpose of this exercise was to gather data both on exhibits and the data gathering process for later application to the Space Discovery Center. We originally envisioned a terminal in or near each exhibit. However, with 20+ exhibits and limited additional booth space, this was not possible. In addition, we did not have access to that many machines.

We set up five computers in the exhibit area to solicit reactions to various exhibits. See Appendix B for the flyer on the exhibit questionnaire and equipment descriptions.

Exhibit reaction questions are particularly dependent on the background of the respondents, so we developed extensive demographic questions. Our original intent was to model the Smithsonian's technique of gathering background information once and tying responses together using a code the attendees would enter each time they used the machines. (Smithsonian uses barcode readers and gives each person entering the exhibit area a brochure with a unique barcode on it.) Smithsonian gathers the background data by simulating the 1890 census. We could do the same in a permanent exhibit by developing an interactive program that purports to tell people what they would be doing in space 100 years from now. All we would need to know is what they are doing now.(!) Great concept. For this expo, we decided we wouldn't have enough control to get codes to everyone so we did not use the one-time demographics idea. For a layout of the exhibit hall, see Appendix B.

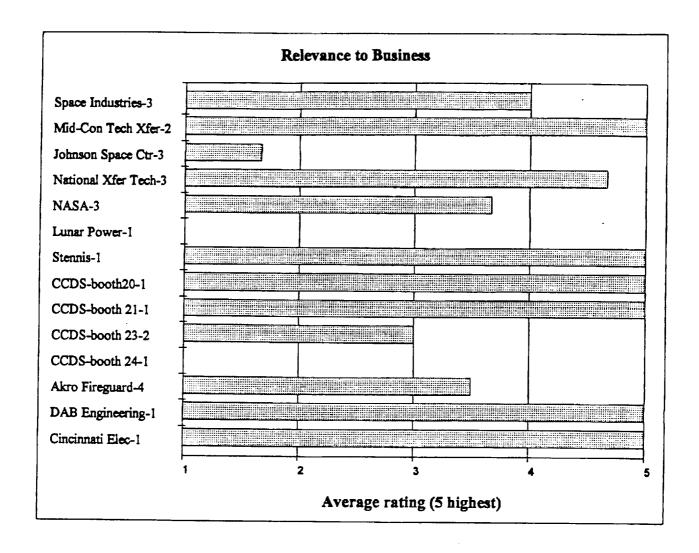
The final question set was streamlined as much as possible. In addition, we encouraged people to respond to more than one exhibit at a time, asking only the exhibit reaction questions for the second exhibit. Questions are in Appendix C.

We received 29 usable exhibit reactions on 14 exhibits. Some people apparently started the process and then quit midway through. It is apparent that if one wants exhibit reactions, the machine to collect the data must be part of the exhibit, the questionnaire must be short, and demographics must be collected separately.

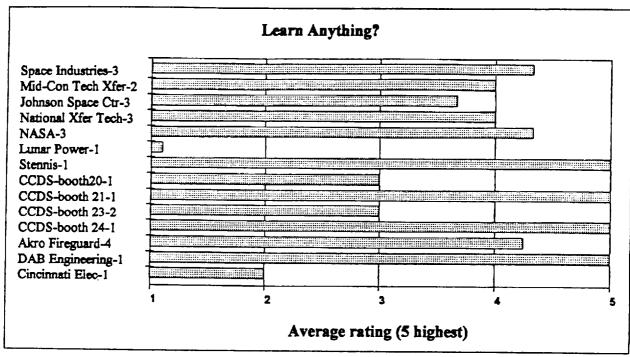
The following charts summarize the data. There was only one really problem exhibit—the Lunar Power Coalition which was a fund-raiser for a group not widely known trying to get power off the moon. A real favorite was Akro Fireguard—a down-to-earth application of space technology.

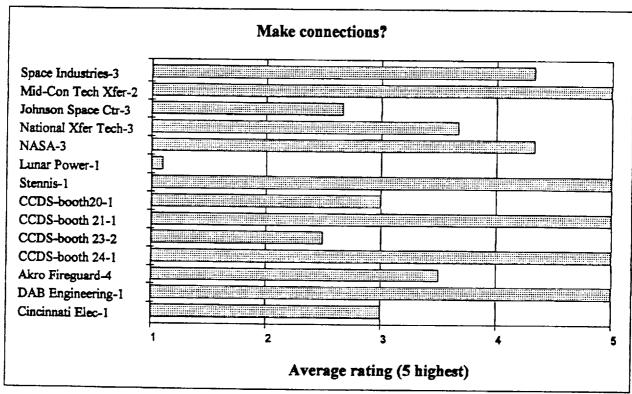
Perceptions: How did the visitors respond to the exhibits?

This chart summarizes reactions to the question: How relevant was this exhibit to your business?

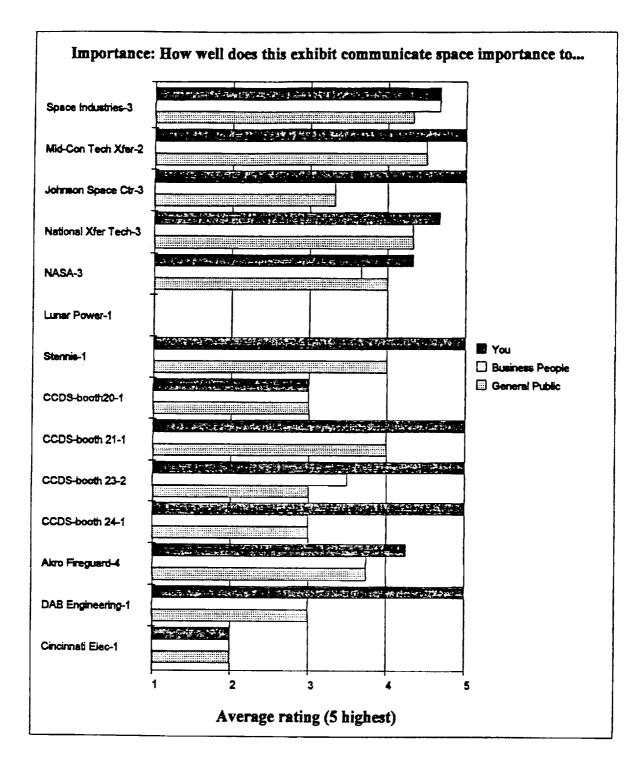


The next two questions tried to get at the educational value of the exhibits. How much did you learn? is straightforward. In addition, Dr. Clarke suggested that some people are reluctant to admit they learned something—this would mean there were things they didn't know. Therefore, we inserted a question asking if they didn't learn anything new, did the exhibit help them organize previous knowledge better or make connections?



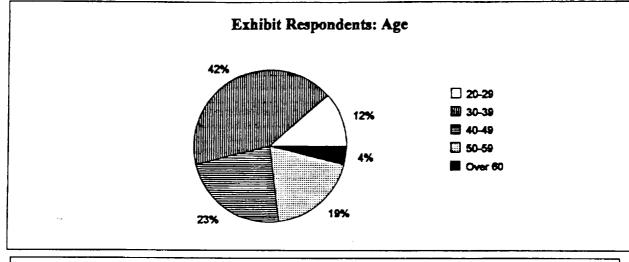


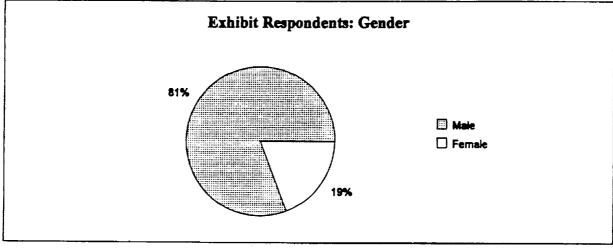
The three questions summarized on this page tried to assess how an exhibit stressed the importance of space. The challenge here was to separate current feelings about space regardless of the exhibit and feelings caused by the exhibit. That's why we asked the two follow-on questions—guesses about business people and the general public to try to get the respondents outside themselves somewhat.

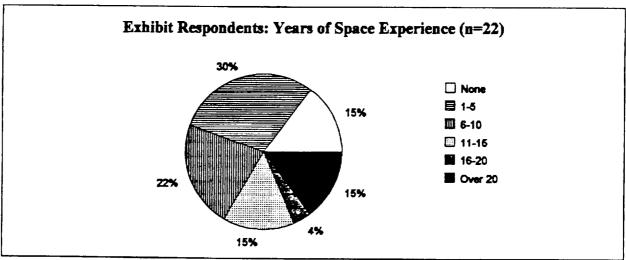


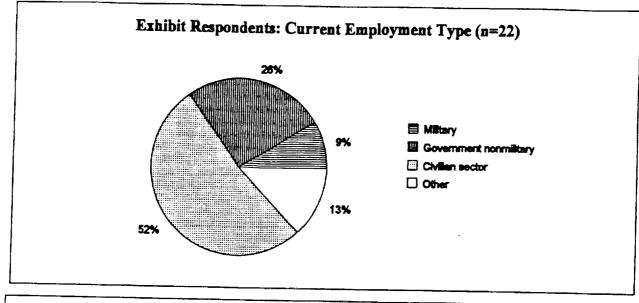
Demographics: Who came to the exhibits?

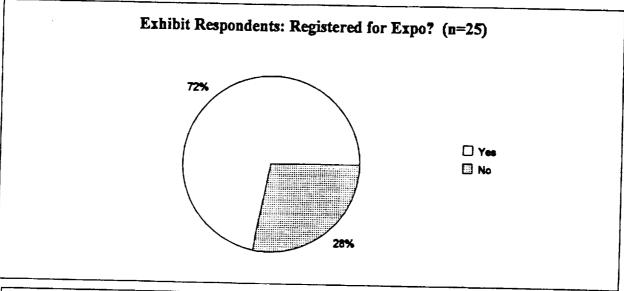
The following charts depict the demographics of the exhibit respondents and are self-explanatory.

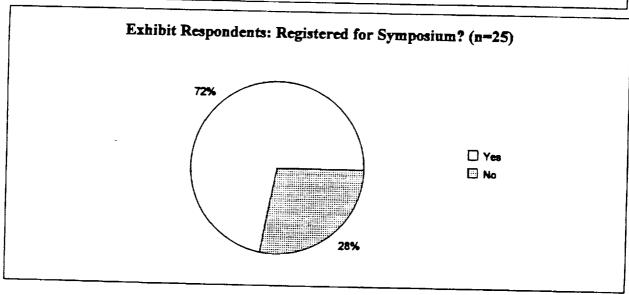


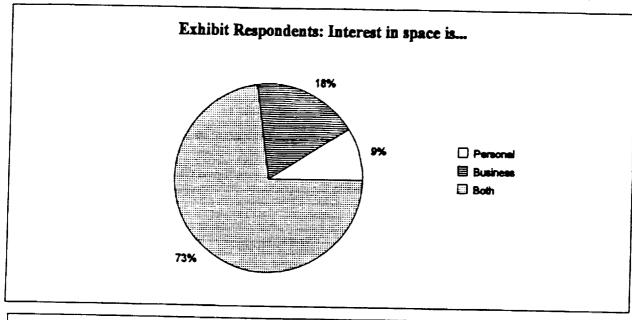


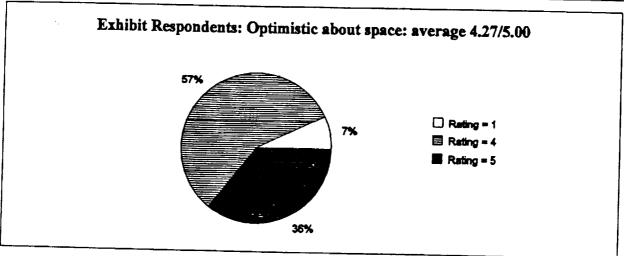


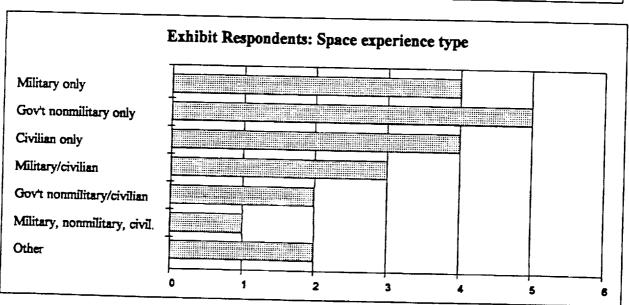












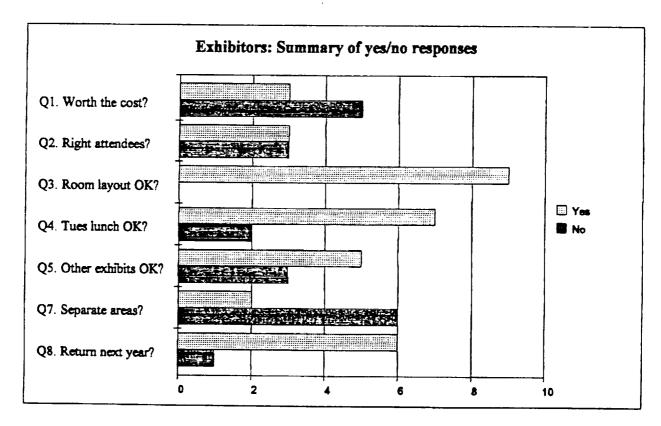
Exhibitor Interviews

On Wednesday (day two of the Expo exhibits) Dr. Darwyn Linder interviewed the following exhibitors, asking them the questions you will see displayed with their responses. Those interviewed were:

- 1: Sievers Instruments, Richard Hutti
- 2: DAB Engineering, David Baker
- 3: AKRO Fireguard, George Tonker
- 4: Cincinnati Electronics, Bill Lampe
- 5: Stennis Space Center, Ron Birch
- 6: Lunar Power System Coalition, Jerry Dickinson
- 7: National Technology Transfer, Nancy Wesolowski
- 8: Johnson Space Center, Gerald Stoloripple
- 9: CCDS
- 0: CCDS CMDS, Valerie Lequist

In the following transcriptions, responses will be linked to these numbers. Responses are displayed without comment in this report.

Some of the questions elicited yes/no responses. Summaries of those questions, keyed to the question numbers as summarized on pages 17 - 20, are displayed below. Some respondents had mixed feelings in some areas. The chart does not display those responses, but they are evident by how far the total of yes/no responses falls below 10.



1. Overall, was it worth what it cost you to exhibit here?

- 1: Yes, but goal was to be here, not to sell.
- 2: Can't say right now, but present feeling is no.
- 3: Disappointed, not clear that 2 exhibit halls
- 4: Probably not, not enough traffic.
- 5: No, lack of attendance, lack of coordination; little communication.
- 6: Tuesday was good; Wednesday a waste of time
- 7: No, need more people, too far from Symposium
- 8: So far, no-need more people
- 9: No easy answer, yes
- 0: Yes, able to be with other CCDS

2. Were the attendees a group that you wanted to reach?

- 1: Yes, but wanted to contact some of the symposium exhibitors.
- 2: Marginally; one of four was the right person, engineering analysts.
- 3: No, not coming through this hall.
- 4: In general, no; people weren't interested; needed people who build and fly satellites.
- 5: Yes
- 6: Yes
- 7: Definitely
- 8: Not yet; more major airlines, engineers, designers
- 9: No, need more private sector interest; we had exhibitors talking to exhibitors
- 0: Not as much as hoped; more industry

3. Was the physical layout of the exhibit hall OK?

- 1: This room was fine but didn't get traffic and people from symposium.
- 2: Yes, but location.
- 3: Fine
- 4: Great
- 5: Put NASA Tech Transfer in center organizing for impact.
- 6: Very nice
- 7: Yes
- 8: Yes
- 9: Great
- 0: Fine

4. How did you like the lunch arrangement on Tuesday?

- 1: Yes, brought a few people.
- 2: No, people talked to each other.
- 3: Generated some traffic.
- 4: Worked well
- 5: Yes, but put coffee and donuts, something to draw people in.
- 6: Drew people
- 7: Helped to get people, about 20-that was the only traffic
- 8: Did not generate traffic to booth
- 9: Fine, but people stood at tables in center
- 0: OK but a bit confusing

5. Were the other exhibits the right context for you?

- 1: Yes, NASA and CCDS
- 2: No, need similar companies, pure commercial.
- 3: No
- 4: No, want to be with people who supply similar boxes.
- 5: In general, but pull in defense contractors as they change to commercial; USSF should manage this.
- 6: Yes
- 7: Yes
- 8: In general, yes
- 0: Yes

6. Are there any companies that we should try to get to exhibit?

- 1: Photo catalytics—Boulder
- 2: Launch vehicle—other software companies—Microsoft group—organize exhibitors by category
- 3: Symposium exhibitors are relevant to their concerns.
- 4: OK
- 5: Entrepreneurial companies, list of attendees; ARPA money for USSF to fund attendance by small companies.
- 7: Economic Development agencies, state and local
- 0: Get mailing list of CCDS industry members

7. Is it OK to separate the commercial exhibitors from the others?

- 1: No, put everything in one hall—may be an advantage to scatter(?) main companies.
- 2: Yes, but difficult to make distinction.
- 3: No!
- 4: Makes sense to have separate facilities.
- 5: No, but problem of disparity between displays; put near but not in same room.
- 6: Not a good idea because of lack of traffic
- 7: No.
- 8: Combine with symposium or move closer
- 9: Combine the two
- 0: Better if with symposium

8. Will you return to the Commercial Space Expo next year?

- 1: Someone else's decision.
- 2: Uncertain
- 3: Will consider
- 4: Probably not
- 5: Important
- 6: Yes
- 7: Yes, if logistics change
- 8: Probably
- 9: Yes
- 0: Yes if as a CCDS

9. If yes, how can we make it better for you? If no, what would it take?

- 1: Put meeting rooms and exhibits close together.
- 2: Must be together with symposium exhibitors marketing to exhibitors, need to know plan, what companies. Commercial should mean people who sell.
- 3: Need commercial success
- 4: Want to put booth in Symposium but would consider if traffic flow increased.
- 5: Clearly identify nature of Expo, didn't know about program for Expo, make known to public to draw them in.
- 6: Put everything in same area.
- 7: Put everybody in one exhibit hall; put in main hotel
- 8: Get closer to other guys
- 9: Combining with symposium exhibits
- 0: Wider audience

10. Any other comments?

- 2: Advertising "late and furious". Get started early. Couldn't get numbers about attendees need better communication.
- 3: Communication poorly handled.
- 4: International Telemetry conference. USSF staff helpful.
- 5: Encourage to present commercial products rather than defense products. Need some younger participants, people from outside the group. Make environmental issues a focus, get the issues from the people who know them.
- 6: Need more people; make it easy
- 7: Put soda and coffee in exhibit room; need signs in main lobby; Broadmoor staff needed briefing to direct
- 9: Support was excellent; Yvette put CCDS next to big NASA exhibit
- 0: Broadmoor is nice; staff excellent

Summary

This report has summarized data gathered at the Commercial Space Expo, April 13, 14, 1993.

The registrants' surveys indicated that the sessions were essentially all well received by both industry and government—no obvious problem sessions. The surveys also revealed something about the type of people who came to the Expo—government and large industry—few small business.

The exhibit reaction survey exercise indicated that having a few computers scattered through the hall is not effective for gathering exhibit-specific data. More than likely, an interactive display colocated with an exhibit would do better. The returns did indicate that some exhibits do better than others along the dimensions we measured. The exhibit reaction demographics were slightly different from the registrant survey demographics indicating that we did attract some people from outside the Symposium/Expo attendees.

The exhibit interviews should be invaluable to next year's event planners—some things were well received and others not. The consensus seemed to be that they want their exhibits closer to the Symposium and more accessible so they can attract more people.

Overall, the Expo data collection process has produced directions for future research as well as provided some preliminary results.

Appendix A

Commercial Space Expo Registrants Survey

Commercial Space Expo Survey for Registrants

The Commercial Space Expo is partially sponsored by NASA and includes a research component. Specifically, NASA needs to know how this type event can better serve YOU. Please circle the number of your response.

- 1. Which entries best describe your college degrees? (circle all that apply)
 - 0 I don't have a college degree
 - 1 bachelor-technical
 - 2 bachelor-nontechnical
 - 3 master's or higher-technical
 - 4 master's or higher-nontechnical
- 2. Who sponsored your registration?
 - 1 Personal/private
 - 2 Company
 - 3 Government
 - 4 Other (please specify)

If company-sponsored, please answer questions 3 - 6. If government-sponsored, please answer question 7. If neither company nor government sponsored, please go directly to question 8.

- 3. How large is the company in terms of number of employees?
 - 1 Less than 50
 - 2 Between 50 and 200
 - 3 Between 200 and 500
 - 4 More than 500
- 4. What type business is your company involved with? (circle all that apply)
 - 1 Manufacturing
 - 2 Research and development
 - 3 Engineering
 - 4 Sales
 - 5 Other (please specify)
- 5. Is your company in or does it market to the aerospace industry today? Circle all that apply.
 - 1 Yes, with NASA

3 Yes, commercial

2 Yes, with DoD

4 No

6. What areas of aerospace business do you intend to continue or add within the next year?

1 NASA

3 Commercial

2 DoD

- 4 None
- 7. If you are government-sponsored, which agency do you represent?
 - 1 DoD
 - 2 NASA
 - 3 Other (please specify)
- 8. Are you a registered attendee of the National Space Symposium?
 - 1 yes
 - 2 no
- 9. What is your gender?
 - 1 Female
 - 2 Male

On a scale of 1 (poor) to 5 (outstanding), please rate each session or subsession with respect to quality of presentation and how useful the material will be for planning your future professional or business activities. (circle or check the appropriate number)

Keynote (Gregory Red	ek)				
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
Business opportunitie	s: Biotech	nology			
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
Business opportunitie	s: Material	s Processing	i		
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
Business opportunitie	s: Informa	tion processi	ing		
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
Business opportunitie	s: Infrastr	ucture Devel	opment		
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
Business Perspective					
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
Roundtable: Response	to Issues				
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
Roundtable: Response	to Questio	ns			
Presentation	(1)	(2)	(3)	(4)	(5)
Usefulness	(1)	(2)	(3)	(4)	(5)
	· ·	• •	\ - /	\ - <i>y</i>	\- /

How supportive are you of continued involvement of the United States (or your country) in space exploration and technology?

5: Very supportive

4:

3: Somewhat supportive

2:

1: Not supportive

How optimistic are you about your or your company's potential for success in space/space technology?

- 5: Very optimistic
- 4: Somewhat optimistic
- 3: Neither optimistic or pessimistic
- 2: Somewhat pessimistic
- 1: Very pessimistic

Appendix B

Exhibit Questionnaire Computer Setup

Take a trip down the Memory Lane of PCs and participate in some NASA-sponsored research!

As part of research for the Commercial Space Expo and the U.S. Space Foundation's future Space Discovery Center, we'd like your reactions to the exhibits as you go through the hall.

Throughout the Exhibit Hall there are computer terminals. Each is loaded with a program to ask you a few questions about an exhibit you have visited and also collect a little background information. You can report on several exhibits in succession if you want. You'll be able to record your opinions in less than a minute.

To make your participation more interesting, we've gathered together the history of PCs from an original IBM XT "Portable" to a Digital 386 compact laptop. Can you remember when you would have "killed" for one of these—even the XT?

Entrance

11 T	15	20
13	17 16	21
14	18 19	22
T	T	23
T = Terminal		24

T 25 26 27 28 3	T
-----------------	---

Commercial Space Expo Exhibit Hall

- 11: Space Industries, Inc.
- 12: Survey Anchor Booth
- 13: Mid-Continent Technology Transfer
- 14: Johnson Space Center
- 15: National Transfer Technologies
- 16: NASA
- 17: Lunar Power System Coalition
- 18: Stennis Space Center
- 19: Advanced Materials
- 20-24: CCDSs -- 23: Mapping 24: Space Vacuum
- 25: Akro Fireguard Products, Inc.
- 26: DAB Engineering
- 27: Cincinnati Electronics Corp
- 28: Sievers Industries

Please take a minute to record your impressions of one or more exhibits you have visited.

Visit a few more and come back!

Research sponsored by NASA and the United States Space Foundation

IBM Personal Portable Computer

First portable IBM made, circa 1984.

8088 processor (XT).

"Portable": 17" x 19.5" x 7.5", 33 pounds!!

This one has been upgraded with an extra floppy drive and memory expanded from 256K to 640K. It used to have a 20 meg hard drive.

Time on a math-intensive, iteration-heavy test routine:

*8088 (XT)	10 minutes
286 (AT)	1 minute, 20 seconds
486-33	7 seconds

Please take a minute to answer a few questions on exhibits you've visited. This machine runs the survey just fine!

286 (AT) Clone

A great machine originally and still.

It won't run some of the newer software, but handles basic word processing and spreadsheets well.

Purchased in late 1989 for under \$2,000, it came with a 40 meg hard drive and 1.2 meg memory. Another 20 meg hard drive has been added.

It's been relegated to second string since its owner just purchased a 486-33, 4 meg memory with 170 meg hard drive for under \$1,600.

Time on a math-intensive, iteration-heavy test routine:

8088 (XT)	10 minutes
*286 (AT)	1 minute, 20 seconds
486-33	7 seconds

Please take a minute to answer a few questions on exhibits you've visited. This machine runs the survey just fine!

Zenith Sport Laptop

circa 1990

Still just an 8088 processor (XT) but it's a true laptop, smaller than the Zenith luggable at

12" x 12" x 3", 12 pounds.

640K memory with 20 meg hard drive; reads 3.5" floppies.

Time on a math-intensive, iteration-heavy test routine:

*8088 (XT)	10 minutes
286 (AT)	1 minute, 20 seconds
486-33	7 seconds

Please take a minute to answer a few questions on exhibits you've visited. This machine runs the survey just fine!

(Press a key to bring the screen to life.)

DECpc 320P Laptop

With a 386SX-20, it's more powerful than the AT yet the smallest of the laptops here, weighing in at less than 7 pounds.

With 4 megs memory and a 20 meg hard disk, this is all the computer some people need.

Time on a math-intensive, iteration-heavy test routine:

8088 (XT) 10 minutés
286 (AT) 1 minuté, 20 seconds
*DECpc 320P 1 minute, 18 seconds
486-33 7 seconds

Please take a minute to answer a few questions on exhibits you've visited. This machine runs the survey very well!

Appendix C

Exhibit Reaction Questionnaire

Computerized Exhibit Reaction Survey

Questions were presented by computers located throughout the exhibit hall.

Questions

What exhibit are you reporting on?

How relevant is this exhibit to your business?

5: Very relevant

4:

3: Moderately relevant

1: Not relevant

0: No opinion

On a scale of 5-1, how much did you learn about space, space technology, the benefits of space technology or business applications in aerospace from this exhibit?

5: A lot

4:

3: Some

2:

1: Nothing

0: No opinion

On a scale of 5-1, how much did this exhibit help you organize your previous knowledge or make connections about space, space technology, the benefits of space technology or business applications in aerospace?

5: A lot

4:

3: Somewhat

1: Nothing at all

0: No opinion

How important do you think space and space technology is based on this exhibit? You think space and space technology is...

5: Very important to the future of the United States or the world

3: Moderately important

1: Unimportant

How much importance do you believe others would attach to space and space technology based on this exhibit? On a scale of 5-1, BUSINESS PEOPLE OUTSIDE AEROSPACE might think space and space technology is...

5: Very important to the future of the United States or the world

3: Moderately important

1: Unimportant

How much importance do you believe others would attach to space and space technology based on this exhibit? On a scale of 5-1, the GENERAL PUBLIC might think space and space technology is...

5: Very important to the future of the United States or the world

4:

3: Moderately important

2:

1: Unimportant

What is your gender?

1: female

2: male

How old are you?

Where do you live? (Press the first three digits of your zip code. If you are not from the United States, please type a 3-letter abbreviation for your country.)

Which of the following best describes the degrees you have? Press the number of all that apply; press 0 when you are finished.

1: Bachelor--technical

2: Bachelor--nontechnical

3: Graduate--technical

4: Graduate--nontechnical

How many years of space-related work experience do you have?

[If greater than 0 on last question] Was your experience... (press all that apply; press 0 when finished)

1: Military

2: Government, non-military

3: Civilian

4: other or not applicable

Which of the following best explains why you are here?

1: Personal interest in space only

2: Business interest in space only

3: Both business and personal interest in space

4: Other

Where are you employed?

1: Military

2: Government, non-military

3: Civilian sector

4: Other or not applicable

[if civilian employed]

How large is your company in terms of number of employees?

1: 1-50

2: 51-200

3: 201-500

4: more than 500

Is your company involved in space-related activity today?

- 1: yes
- 2: no

[if yes]

What areas of space-related business does your company intend to pursue or continue within the next year? (Press the number of all that apply. Press 0 when you are finished.)

- 1: NASA
- 2: Department of Defense
- 3: Commercial
- 4: None
- 5: I don't know

[for all]

Are you a registered attendee or exhibitor of the Commercial Space Expo?

- 1: Yes
- 2: No

Are you a registered attendee or exhibitor of the Space Symposium?

- 1: Yes
- 2: No